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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
MARKHAM, WESLEY D

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/893,975	YOON, SUNG-HOE	
	Examiner	Art Unit	
	Wesley D Markham	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/20/04 (the RCE)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-5 and 7-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-5 and 7-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application on 7/20/2004 after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office Action (i.e., the Office Action mailed on 3/22/2004) has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/21/2004 has been entered.

Response to Amendment

2. Acknowledgement is made of the amendment filed by the applicant on 6/21/2004, in which Claims 1 and 3 were amended. Claims 1, 3 – 5, and 7 – 9 are currently pending in U.S. Application Serial No. 09/893,975, and an Office Action on the merits follows.

Drawings

3. The formal drawings (3 sheets, 3 figures) filed by the applicant on 6/29/2001 are approved by the examiner.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. The rejection of Claim 3 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, set forth in paragraph 7 of the previous Office Action, is withdrawn in light of the applicant's amendment in which Claim 3 was amended to depend from Claim 1 (i.e., instead of canceled Claim 2).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3 – 5, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Chung et al. (USPN 5,995,184).

8. Regarding independent **Claim 1**, Chung et al. teaches a method of fabricating an optical film (Abstract), the method comprising the steps of preparing a substrate (Figure 4, step "402", Col.4, lines 5 – 8, and Col.6, lines 44 – 49), forming an alignment layer on the substrate (Figure 1, reference number "104", Figure 4, step "404", Col.4, lines 8 – 16, and Col.6, lines 50 – 54), rubbing the alignment layer (Col.6, lines 54 – 61), and forming a liquid crystal (LC) layer on the alignment layer,

the LC layer including an additive (Figure 4, step "408", Col.2, lines 58 – 64, Col.3, lines 4 – 10, Col.5, lines 1 – 50, Col.6, lines 25 – 42, and Col.7, lines 7 – 16). Chung et al. also teaches that the additive includes dimethylsiloxane, as required by Claim 1. Specifically, Chung et al. teaches that the additive can be a surfactant such as polydimethylsiloxane (PDMS) (Col.5, lines 31 – 32). In this case, the examiner has reasonably interpreted PDMS to be an additive that "includes dimethylsiloxane", as claimed by the applicant. Further, Chung et al. teaches that forming the liquid crystal layer comprises coating a liquid crystal including the additive and curing / crosslinking (i.e., "plasticizing") the liquid crystal on the substrate (Figure 4, steps "410" and "412", Col.3, lines 4 – 10, Col.4, lines 43 – 46, and Col.7, lines 18 – 44). Chung et al. also teaches that the additive (i.e., the surfactant) is spontaneously disposed in an interface between the liquid crystal layer and air when forming the liquid crystal layer on the alignment layer (Abstract, Col.3, lines 4 – 10, and Col.4, lines 30 – 35). Chung et al. also teaches that the additive is a "non-reactive" surfactant (Col.5, lines 17 – 23). This is equivalent to stating that the additive does not react with the liquid crystal during the plasticizing of the liquid crystal, as claimed by the applicant. In the alternative to this reasoning, the additive of Chung et al. (i.e., a polydimethylsiloxane surfactant) is equivalent to the applicant's claimed additive (i.e., an additive including dimethylsiloxane), and the liquid crystal curing / plasticizing process taught by Chung et al. is equivalent to the applicant's claimed liquid crystal plasticizing process. Therefore, the polydimethylsiloxane additive of Chung et al. would have inherently not reacted with the liquid crystal during the

plasticizing process. Chung et al. does not explicitly teach that the optical film produced by the claimed method is a "color filter". However, the film produced by Chung et al. (i.e., a substrate coated with a rubbed alignment layer, and then coated with a plasticized / cured liquid crystal layer that has a polydimethylsiloxane surfactant disposed between the liquid crystal layer and air) is identical to the film produced by the applicant's claimed method. Therefore, unless essential process steps and/or limitations are missing from the applicant's claims, the optical film produced by Chung et al. would have inherently functioned or be capable of functioning as a "color filter". In other words, since Chung et al. teaches all the steps and limitations of the applicant's claimed process, the product produced by Chung et al. is equivalent to the applicant's claimed product and thus qualifies as a "color filter". Regarding **Claim 3**, Chung et al. also teaches that plasticizing the LC including the additive on the substrate uses one of UV rays or heat (Figure 4, steps "410" and "412", Col.3, lines 4 – 10, Col.4, lines 43 – 46, and Col.7, lines 18 – 44). Regarding **Claim 4**, Chung et al. also teaches that the additive is a surfactant (Col.2, lines 63 – 67, Col.3, lines 1 – 3, and Col.5, lines 15 – 33). Regarding **Claim 5**, Chung et al. does not explicitly teach that the additive (i.e., the surfactant) has both a hydrophobic group and a hydrophilic group. However, Chung et al. does teach that the additives such as PDMS are surfactants (Col.5, lines 15 – 31). In order to be classified as a "surfactant", a material must necessarily have both a hydrophobic group and a hydrophilic group (see, for example, Col.5, lines 59 – 62 of Brandon et al. (USPN 5,674,671), and/or Col.5, lines 10 – 15, of Rudnic et al. (USPN

5,987,876), both of which are simply cited to show that surfactants have both a hydrophobic group and a hydrophilic group). Therefore, since Chung et al. teaches that the additive is a surfactant, and surfactants necessarily have both a hydrophobic group and a hydrophilic group, Chung et al. inherently teaches that the additive has both a hydrophobic group and a hydrophilic group, as claimed by the applicant in Claim 5. Regarding **Claim 7**, Chung et al. also teaches that the LC layer is a cholesteric LC layer. Specifically, Chung et al. teaches that their method is utilized to produce cholesteric compensators (Abstract and Col.2, lines 46 – 52). Regarding **Claim 8**, Chung et al. also teaches that the LC layer is a nematic LC layer. Specifically, Chung et al. teaches that the compensator produced by their method has a "nematic / air interface" (Col.2, lines 55 – 57), which is equivalent to stating that the LC layer (i.e., the layer that has an interface with the air) is a "nematic" LC layer.

9. Claims 1, 3 – 5, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamada (USPN 5,667,854).

10. Regarding independent **Claim 1**, Yamada teaches a method of fabricating an optical film (Abstract), the method comprising the steps of preparing a substrate (Col.6, lines 2 – 5, Col.7, line 15, and Col.17, lines 43 – 61), forming an alignment layer on the substrate (Col.7, lines 15 – 16, and Col.18, lines 30 – 42), rubbing the alignment layer (Col.3, lines 62 – 64, Col.7, lines 17 – 19, and Col.18, lines 39 – 42), and forming a liquid crystal (LC) layer on the alignment layer, the LC layer including an

additive (Col.4, lines 20 – 28, Col.7, lines 18 – 21 and 56 – 62, Col.8, lines 36 – 43, Cols.9 – 10, Col.16, lines 49 – 59, and Col.17, lines 30 – 35). Yamada also teaches that forming the liquid crystal layer comprises coating a liquid crystal including the additive and curing / crosslinking (i.e., "plasticizing") the liquid crystal on the substrate (Col.4, lines 29 – 31, Col.7, lines 22 – 33, Col.16, lines 37 – 48, and Col.17, lines 36 – 42). Further, Yamada teaches that the additive is a surfactant, particularly a surfactant having both a hydrophobic group and a hydrophilic group, more particularly an additive including a dimethylsiloxane surfactant (Col.8, lines 36 – 43, and Col.9, lines 35 – 42). Yamada does not explicitly teach that the additive is spontaneously disposed in an interface between the liquid crystal layer and air when forming the liquid crystal layer on the alignment layer, and that the additive does not react with the LC during the plasticizing of the LC. However, the surfactant taught by Yamada (i.e., a dimethylsiloxane surfactant having both a hydrophobic group and a hydrophilic group – see Col.9, lines 35 – 65) is identical to the applicant's claimed and disclosed surfactant, and the liquid crystal curing / plasticizing process taught by Yamada is equivalent to the applicant's claimed liquid crystal plasticizing process. Therefore, the dimethylsiloxane surfactant additive of Yamada would have inherently been spontaneously disposed in an interface between the liquid crystal layer and air when forming the liquid crystal layer on the alignment layer and would have inherently not reacted with the liquid crystal during the plasticizing process, as claimed by the applicant, unless essential process steps and/or limitations are missing from the applicant's claims. Yamada does not explicitly teach that the optical

film produced by the claimed method is a "color filter". However, the film produced by Yamada (i.e., a substrate coated with a rubbed alignment layer, and then coated with a plasticized / cured liquid crystal layer that contains a dimethylsiloxane surfactant) is identical to the film produced by the applicant's claimed method. Therefore, unless essential process steps and/or limitations are missing from the applicant's claims, the optical film produced by Yamada would have inherently functioned or be capable of functioning as a "color filter". In other words, since Yamada teaches all the steps and limitations of the applicant's claimed process, the product produced by Yamada is equivalent to the applicant's claimed product and thus qualifies as a "color filter". Regarding **Claim 3**, Yamada also teaches that plasticizing the LC including the additive on the substrate uses one of UV rays or heat (Col.4, lines 29 – 31, Col.7, lines 22 – 33, Col.16, lines 37 – 48, and Col.17, lines 36 – 42). Regarding **Claims 4 and 5**, Yamada also teaches that the additive is a surfactant having both a hydrophobic group and a hydrophilic group (see the dimethylsiloxane surfactants discussed and depicted on Cols. 9 – 10 of Yamada). Regarding **Claim 8**, Yamada also teaches that the LC layer is a nematic LC layer (Col.4, lines 13 and 32, Col.10, lines 58 – 59, and Col.16, lines 37 – 48).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. In the alternative to the reasoning presented above in paragraph 8, Claims 1, 3 – 5, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Yamada (USPN 5,667,854).

13. Specifically, if the applicant intends to exclude PDMS from Claim 1 by reciting that the additive includes dimethylsiloxane (i.e., not polydimethylsiloxane), Chung et al. teaches all the limitations of **Claims 1, 3 – 5, 7, and 8** as set forth above in paragraph 8, except for a method wherein the additive (i.e., a surfactant having both a hydrophobic group and a hydrophilic group) includes dimethylsiloxane. However, Chung et al. does teach that the additive can be a non-reactive surfactant in general, and the specific surfactant utilized does not appear to be limited (Col.5, lines 15 – 32). An example of the classes of surfactants taught by Chung et al. is a non-reactive silicon oil surfactant (Col.5, line 22). Yamada teaches a similar method of forming an optical sheet in which a surfactant is included in the LC layer / composition (Abstract and Col.4, lines 22 – 28). Further, Yamada teaches that dimethylsiloxane can be utilized as the surfactant (Col.9, lines 35 – 42) and that the inclined angle of the LC compound on a surface side (air side) can be controlled by selecting the compound(s), such as the surfactant, employed together with the LC compound (Col.16, lines 49 – 57). Therefore, it would have been obvious to one of ordinary skill in the art to utilize dimethylsiloxane (as taught by Yamada) as the surfactant in the process of Chung et al. with the reasonable expectation of

successfully and advantageously choosing and utilizing a specific, well-known surfactant (i.e., dimethylsiloxane) out of the broader genus of surfactants taught generally by Chung et al. One of ordinary skill in the art would have done so with the expectation that the objectives of Chung et al. (i.e., producing an optical compensator for improving the viewing angle and contrast of LCDs) would have been met, regardless of the exact surfactant utilized. Since the combination of Chung et al. and Yamada reasonably suggests utilizing dimethylsiloxane as the surfactant in the process, the limitation that the additive has both a hydrophobic group and a hydrophilic group is also met (i.e., because the dimethylsiloxane surfactants taught by Yamada have both a hydrophobic and a hydrophilic group). Additionally, the surfactant taught by the combination of Chung et al. and Yamada (i.e., a dimethylsiloxane surfactant having both a hydrophobic group and a hydrophilic group – see Col.9, lines 35 – 65) is identical to the applicant's claimed and disclosed surfactant, and the liquid crystal curing / plasticizing process taught by Chung et al. is equivalent to the applicant's claimed liquid crystal plasticizing process. Therefore, the dimethylsiloxane surfactant additive used in the process of the combination of Chung et al. and Yamada would have inherently not reacted with the liquid crystal during the plasticizing process, as claimed by the applicant. Further, since the structure of the optical film produced by the process of the combination of Chung et al. and Yamada is identical to the structure of the applicant's claimed optical film, the film produced by the combination of Chung et al.

and Yamada would inherently be a "color filter" (see the discussion in paragraph 8 above for details).

14. Claims 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Scheuble et al. (USPN 5,308,535).

15. In the alternative to the reasoning / reference interpretation presented above in paragraph 8, Chung et al. teaches all the limitations of **Claims 7 – 9** as set forth above in paragraph 8, except for a method wherein the LC layer is a cholesteric LC layer (Claim 7), a nematic LC layer (Claim 8), or a smectic LC layer (Claim 9). However, it is the purpose of Chung et al. to produce a liquid crystalline optical compensator for improving the viewing angle and contrast of LC displays (Abstract). Scheuble et al. teaches that, in the art of producing a liquid crystalline optical compensator (i.e., a device analogous to that produced by Chung et al.), the LC layer(s) of the compensator can be either nematic, smectic, or cholesteric, depending on the particular application (i.e., end use) of the compensator (Col.13, lines 25 – 56). Therefore, it would have been obvious to one of ordinary skill in the art to utilize any one of nematic, smectic, or cholesteric LC polymers in the LC layer of the optical compensator of Chung et al. with the reasonable expectation of successfully and advantageously producing a compensator for improving the viewing angle and contrast of LC displays (i.e., achieving the objective of Chung et al.), regardless of the specific type / orientation of the LC material that it utilized. As taught by Scheuble et al., the specific type of LC material (i.e., nematic, smectic, or

cholesteric) utilized in the process of Chung et al. would be determined by one of ordinary skill in the art based on the desired end-use of the optical compensator.

16. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Hanmer et al. (WO 98/00475 A1).

17. In the alternative to the reasoning / reference interpretation presented above in paragraph 8, Chung et al. teaches all the limitations of **Claims 8 and 9** as set forth above in paragraph 8, except for a method wherein the LC layer is a nematic LC layer (Claim 8) or a smectic LC layer (Claim 9). However, it is the purpose of Chung et al. to produce a liquid crystalline optical compensator for improving the viewing angle and contrast of LC displays (Abstract). Hanmer et al. teaches a similar method of producing a liquid crystal compensation film (Abstract). Hanmer et al. also teaches that, in a preferred embodiment, the polymerizable mesogenic material (i.e., the polymerizable LC material) exhibits nematic or smectic phases, most preferably the smectic phase because alignment is less easily disturbed prior to curing (page 11, lines 14 – 19). Therefore, it would have been obvious to one of ordinary skill in the art to utilize either nematic or smectic polymerizable mesogens (i.e., LC materials) in the LC layer of the optical compensator of Chung et al. with the reasonable expectation of successfully and advantageously producing a compensator for improving the viewing angle and contrast of LC displays (i.e., achieving the objective of Chung et al.), regardless of the specific type / orientation of the LC material that it utilized. Further and regarding Claim 9, an additional

motivation to utilize a polymerizable smectic LC material in the process of Chung et al. is that such a material advantageously provides alignment that is less easily disturbed prior to curing.

18. Claims 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Yamada (USPN 5,667,854), in further view of Scheuble et al. (USPN 5,308,535).

19. In the alternative to the reasoning / reference interpretation presented above, the combination of Chung et al. and Yamada teaches all the limitations of **Claims 7 – 9** as set forth above in paragraph 13, except for a method wherein the LC layer is a cholesteric LC layer (Claim 7), a nematic LC layer (Claim 8), or a smectic LC layer (Claim 9). However, it is the purpose of Chung et al. to produce a liquid crystalline optical compensator for improving the viewing angle and contrast of LC displays (Abstract). Scheuble et al. teaches that, in the art of producing a liquid crystalline optical compensator (i.e., a device analogous to that produced by Chung et al.), the LC layer(s) of the compensator can be either nematic, smectic, or cholesteric, depending on the particular application (i.e., end use) of the compensator (Col.13, lines 25 – 56). Therefore, it would have been obvious to one of ordinary skill in the art to utilize any one of nematic, smectic, or cholesteric LC polymers in the LC layer of the optical compensator of Chung et al. with the reasonable expectation of successfully and advantageously producing a compensator for improving the viewing angle and contrast of LC displays (i.e., achieving the objective of Chung et

al.), regardless of the specific type / orientation of the LC material that it utilized. As taught by Scheuble et al., the specific type of LC material (i.e., nematic, smectic, or cholesteric) utilized in the process of Chung et al. would be determined by one of ordinary skill in the art based on the desired end-use of the optical compensator.

20. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al. (USPN 5,995,184) in view of Yamada (USPN 5,667,854), in further view of Hanmer et al. (WO 98/00475 A1).

21. In the alternative to the reasoning / reference interpretation presented above, the combination of Chung et al. and Yamada teaches all the limitations of **Claims 8 and 9** as set forth above in paragraph 13, except for a method wherein the LC layer is a nematic LC layer (Claim 8) or a smectic LC layer (Claim 9). However, it is the purpose of Chung et al. to produce a liquid crystalline optical compensator for improving the viewing angle and contrast of LC displays (Abstract). Hanmer et al. teaches a similar method of producing a liquid crystal compensation film (Abstract). Hanmer et al. also teaches that, in a preferred embodiment, the polymerizable mesogenic material (i.e., the polymerizable LC material) exhibits nematic or smectic phases, most preferably the smectic phase because alignment is less easily disturbed prior to curing (page 11, lines 14 – 19). Therefore, it would have been obvious to one of ordinary skill in the art to utilize either nematic or smectic polymerizable mesogens (i.e., LC materials) in the LC layer of the optical compensator of Chung et al. with the reasonable expectation of successfully and

advantageously producing a compensator for improving the viewing angle and contrast of LC displays (i.e., achieving the objective of Chung et al.), regardless of the specific type / orientation of the LC material that it utilized. Further and regarding Claim 9, an additional motivation to utilize a polymerizable smectic LC material in the process of Chung et al. is that such a material advantageously provides alignment that is less easily disturbed prior to curing.

22. Claims 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada (USPN 5,667,854) in view of Scheuble et al. (USPN 5,308,535).

23. Yamada teaches all the limitations of **Claims 7 and 9** as set forth above in paragraph 10, except for a method wherein the LC layer is a cholesteric LC layer (Claim 7) or a smectic LC layer (Claim 9). Specifically, Yamada teaches a nematic LC layer (Col.4, lines 13 and 32, Col.10, lines 58 – 59, and Col.16, lines 37 – 48). However, the LC material used in the process of Yamada does not appear to be particularly limited (Col.7, lines 56 – 60). Scheuble et al. teaches that, in the art of producing a liquid crystalline optical compensator (i.e., a device analogous to that produced by Yamada), the LC layer(s) of the compensator can be either nematic, smectic, or cholesteric, depending on the particular application (i.e., end use) of the compensator (Col.13, lines 25 – 56). Therefore, it would have been obvious to one of ordinary skill in the art to utilize either a smectic or a cholesteric LC material as opposed to a nematic LC material in the LC layer of the optical compensator of Yamada with the reasonable expectation of successfully and advantageously

producing a compensator that improves the viewing angle characteristics of LC displays (i.e., achieving the objective of Yamada), regardless of the specific type / orientation of the LC material that it utilized. As taught by Scheuble et al., the specific type of LC material (i.e., nematic, smectic, or cholesteric) utilized in the process of Yamada would be determined by one of ordinary skill in the art based on the desired end-use of the optical compensator.

24. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada (USPN 5,667,854) in view of Hanmer et al. (WO 98/00475 A1).

25. Yamada teaches all the limitations of **Claim 9** as set forth above in paragraph 10, except for a method wherein the LC layer is a smectic LC layer. Specifically, Yamada teaches a nematic LC layer (Col.4, lines 13 and 32, Col.10, lines 58 – 59, and Col.16, lines 37 – 48). However, the LC material used in the process of Yamada does not appear to be particularly limited (Col.7, lines 56 – 60). Hanmer et al. teaches a similar method of producing a liquid crystal compensation film (Abstract). Hanmer et al. also teaches that, in a preferred embodiment, the polymerizable mesogenic material (i.e., the LC material) exhibits nematic or smectic phases, most preferably the smectic phase because alignment is less easily disturbed prior to curing (page 11, lines 14 – 19). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a smectic LC material in the LC layer of the optical compensator of Yamada instead of a nematic LC material with the reasonable expectation of successfully and advantageously producing a

compensator that improves the viewing angle characteristics of LC displays (i.e., achieving the objective of Yamada), as well as providing the additional advantage of producing an alignment that is less easily disturbed prior to curing.

26. Claims 1, 3 – 5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greenfield et al. (USPN 6,421,107 B1) in view of Yamada (USPN 5,667,854).

27. Regarding independent **Claim 1**, Greenfield et al. teaches a method of fabricating an optical film (Abstract), the method comprising (1) preparing a substrate, (2) forming an alignment layer on the substrate, and (3) forming a liquid crystal layer on the alignment layer, the liquid crystal layer including an additive, specifically a surfactant, wherein forming the liquid crystal layer further includes coating the liquid crystal including the additive (i.e., the surfactant) and plasticizing the liquid crystal on the substrate (Col.2, lines 47 – 57, Col.4, lines 57 – 65, Col.5, lines 55 – 61, Col.19, lines 20 – 48, Col.20, lines 5 – 61, and Example 1), wherein the optical film is a color filter (Abstract, Col.1, lines 4 – 9, Col.3, lines 4 – 10). Greenfield et al. does not explicitly teach that the surfactant additive includes dimethylsiloxane. Specifically, the surfactants taught by Greenfield et al. are fluorine-based surfactants (Col.19, lines 20 – 47). Yamada teaches that, in the art of producing an optical film by depositing a liquid crystal layer containing a surfactant additive onto a rubbed alignment layer (i.e., a process analogous to that of Greenfield et al. – see paragraph 10 above), a silicon atom-containing surfactant, such as dimethylsiloxane, is preferred over a fluorine atom-containing surfactant (i.e., a

surfactant as taught by Greenfield et al.) because a small amount of silicon-containing surfactant is capable of giving a great effect (e.g., reducing non-uniform drying) when compared to a fluorine-containing surfactant (Col.8, lines 36 – 67, Col.9, and Col.10, lines 1 – 52). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a silicon atom-containing surfactant such as dimethylsiloxane, as taught by Yamada, in the liquid crystal layer of Greenfield et al. instead of a fluorine atom-containing surfactant because such a silicon atom-containing surfactant can be used in smaller amounts to give better results (e.g., a reduction in non-uniform drying) than a fluorine atom-containing surfactant. The combination of Greenfield et al. and Yamada does not explicitly teach that the additive is spontaneously disposed in an interface between the liquid crystal layer and air when forming the liquid crystal layer on the alignment layer, and that the additive does not react with the LC during the plasticizing of the LC. However, the surfactant taught by Yamada (i.e., a dimethylsiloxane surfactant having both a hydrophobic group and a hydrophilic group – see Col.9, lines 35 – 65) is identical to the applicant's claimed and disclosed surfactant, and the liquid crystal curing / plasticizing process taught by Greenfield et al. is equivalent to the applicant's claimed liquid crystal plasticizing process. Therefore, the dimethylsiloxane surfactant additive of the combination of Greenfield et al. and Yamada would have inherently been spontaneously disposed in an interface between the liquid crystal layer and air when forming the liquid crystal layer on the alignment layer and would have inherently not reacted with the liquid crystal during the plasticizing process, as

claimed by the applicant, unless essential process steps and/or limitations are missing from the applicant's claims. Regarding **Claim 3**, Greenfield et al. also teaches that plasticizing the LC including the additive on the substrate uses one of UV rays or heat (Col.10, lines 50 – 61). Regarding **Claims 4 and 5**, Yamada also teaches that the additive is a surfactant having both a hydrophobic group and a hydrophilic group (see the dimethylsiloxane surfactants discussed and depicted on Cols. 9 – 10 of Yamada). Regarding **Claim 7**, Greenfield et al. also teaches that the liquid crystal layer is a cholesteric LC layer (Abstract, Col.2, lines 47 – 57, Col.20, lines 5 – 9).

28. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greenfield et al. (USPN 6,421,107 B1) in view of Yamada (USPN 5,667,854), in further view of Saeva et al. (USPN 3,780,307).

29. The combination of Greenfield et al. and Yamada teaches all the limitations of **Claims 8 and 9** as set forth above in paragraph 27, except for a method wherein the LC layer is a nematic LC layer (Claim 8) or a smectic LC layer (Claim 9). However, Greenfield et al. does teach that the first layer (i.e., the layer deposited on the rubbed alignment layer on the substrate) does not necessarily have to be a cholesteric layer (Col.8, lines 13 – 15) and that it is possible to add another liquid crystalline compound to the layer to adapt the optical properties of the film (Col.22, lines 16 – 19). It appears that, in general, Greenfield et al. at least contemplates the use of nematic and smectic LC compounds (Col.22, lines 44 – 48). Saeva et al.

teaches that there are three well-known forms of liquid crystals – cholesteric, nematic, and smectic (Col.1, lines 5 – 26) – and that nematic and/or smectic LC compounds can be used as additives in a cholesteric LC layer in order to modify the absorption and/or reflection bands of the layer when it is used as an optical filter (Col.3, lines 35 – 45, Col.4, lines 49 – 56, Col.8, lines 57 – 68). Therefore, it would have been obvious to one of ordinary skill in the art to add either nematic or smectic LC compounds to the LC layer of the combination of Greenfield et al. and Yamada to produce a nematic or smectic LC layer (as claimed by the applicant) with the reasonable expectation of successfully and advantageously using the nematic or smectic LC compound additive to adapt the optical properties of the film, specifically to modify the absorption and/or reflection bands of the layer when it is used as an optical filter such as a color filter (as taught by Greenfield et al.). The specific nematic and/or smectic LC compound(s) (and their amounts) added to the layer would, of course, depend on the type and degree of optical modification desired by the purveyor in the art.

Response to Arguments

30. Applicant's arguments filed on 6/21/2004 have been fully considered but they are not persuasive.

31. The applicant argues that none of the references cited by the examiner teaches or suggests a method for fabricating a color filter having the elements or features recited in Claim 1. In response, this argument is not convincing. The examiner

acknowledges that neither Chung et al. nor Yamada explicitly teaches that the optical film produced by their methods is a "color filter". However, the films produced by Chung et al. and Yamada (i.e., a substrate coated with a rubbed alignment layer, and then coated with a plasticized / cured liquid crystal layer that contains a (poly)dimethylsiloxane surfactant) are identical to the film produced by the applicant's claimed method. Therefore, unless essential process steps and/or limitations are missing from the applicant's claims, the optical films produced by Chung et al. and Yamada would have inherently functioned or be capable of functioning as "color filters". In other words, since both Chung et al. and Yamada teach all the steps and limitations of the applicant's claimed process, the products produced by Chung et al. and Yamada are equivalent to the applicant's claimed product and thus qualify as "color filters". For further support of the examiner's position, please see Moriya et al. (JP 2002-22921 A), which is cited simply to show that a product comprising a substrate, an alignment film thereon, and a hardened, surfactant containing, LC layer on the alignment film is a "color filter" (Abstract).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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